SALZBRENNER STAGETEC
Audio Video Mediensysteme GmbH

C.A.S. - Analyzer

CAS-1021

User Manual English

Icons Used in This Manual:

Indicates dangerous situations that may affect your health or damage the system.

Indicates dangerous situations that may seriously affect your health or situations where you life is in danger.

Indicates dangerous situations caused by batteries. Such situations may affect your health or damage the system.

Warning!

Indicates situations that may affect proper operation or may void your warranty.

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1 Safety Instructions

- No user-serviceable parts inside. Never open the device.

- Never insert any items into the ventilation slots or other openings of the device. Never try to access any inside parts for repair, service, or other reasons.

- Never position any containers with liquids onto the device. If liquids or items have been inserted into the device, disconnect it from the mains and have it checked by a technician authorized by Salzbrenner Stagetec Audio Video Mediensysteme GmbH before reconnection.

- Make sure that the device is properly ventilated. Never put any items onto the device.

- Make sure that no heavy items are put onto the mains cable or any connection cables. No cables must be caught by heavy items such as the device housing or a rack.

- Do not operate the device in places where it is exposed to dust or excessively high humidity, to reduce the risk of fire or electric shock.

- When disconnecting the device, never pull the cable. Pull the plug only. Damaged cables may cause fire or an electric shock.

- Arrange cables in a way that nobody can walk on them or stumble.

- Make sure that the device is connected only to an appropriate power-supply unit. Failing to do may cause heavy damage to the device.

- Avoid overloading the mains socket by using power strips to reduce the risk of fire or electric shock.

- Condensation may occur inside the device when it is moved from a cool to a warm location. In this case, wait at least 6 hours before connecting the device to the mains.

- I The power cable of the device features a 3-pole plug in order to reduce the risk of electric shock. Connect it only to a properly earthed power socket. Never use any adapters. Never tape the ground contact. When using an extension cable, use a 3-core cable only.

- This device contains a lithium battery. There is danger of explosion if the battery is improperly replaced. Have the battery replaced only by a qualified technician authorized by Salzbrenner Stagetec Audio Video Mediensysteme GmbH. (Find the respective addresses on the inner part of the back cover.) Discard used batteries according to the manufacturers instructions.

- Do not connect the device to telecommunication networks.

- Never operate the device in an explosive area or in an area with aggressive atmosphere.

2 Operating Instructions

With regard to the features and specifications of this product, C.A.S. Analyzer can be used for

- monitoring up to ten power-amplifier channels featuring a potential-free 100-V output (eight of these channels are allocated to fixed lines while two more can be used as emergency channels for substituting failed amplifiers),
- recognizing ground leakage on up to eight 100-V speaker lines,
- checking up to 1024 speaker lines for lost connections and short circuits,
- selectively toggling between two 100-V signals (requires a C.A.S. Master),
- detecting up to four external events,
- transmitting error codes to a matrix printer or a computer.

C.A.S. Analyzer is no autonomous apparatus. The following devices are required for operation:

1. C.A.S. Generator for applying a 20-kHz pilot tone
2. up to 1024 SCBs / LCBs (Speaker-Control Boards) for monitoring connected speakers plus the respective number of speakers featuring a 100-V transmitter
3. up to 10 power amplifiers featuring a potential-free 100-V output

- when using the selective switch/control relay incorporated on the SCBs / LCBs:

4. C.A.S. Master including all required components

- when using the DCF77 signal as clock referral:

5. active receiver antenna

Warning!

This feature can be used only in areas where a DCF77 signal with an adequate strength can be received.

- when logging errors on a matrix printer:

6. a matrix printer (A4/Letter format) featuring a Centronics® interface

The printer should default to a Courier font (12 CPI). We recommend using a tractor-feeder printer and continuous-form paper as these components are least susceptible to malfunctions.

- when logging errors on a personal computer:

7. a personal computer with a configuration identical to the one of the configuration computer (see below)

- when using the optocoupler inputs:

8. DC voltage source(s) for optocoupler connection (for voltage and load specifications, refer to chapter 10 „Specifications“)

The following additional equipment is required for installation:

1. 1 Personal Computer featuring 80386 processor (min. 33 MHz), 16 MB RAM
   1 hard disk with a minimum free space of 3 Mbytes
   1 floppy-disk drive3½", 1.44MB
   1 pointing device (mouse, trackball) that is ready for operation
   1 VGA graphics board
   1 free RS232 interface (COM1...COM4)
   1 installed and running operating system (Microsoft Windows 95 or Microsoft Windows NT 4.0)
2. VGA color monitor 14" with a 640 x 480 resolution
3. C.A.S. Soft configuration software

Some of these products are available as options. Please refer to chapter 11 for which parts can be obtained from our distributors.

The adapters required for establishing signal connections on the back of the device can be obtained from the manufacturer.

Warning!

The manufacturer is not liable for reduced performance, malfunctions, or damages that occur due to

- improper or inadequate servicing executed by the customer,
- software provided by the customer ,
- unapproved alterations,
- operation in locations that do not comply with the operating conditions for this device,
- operation not complying with the electric specifications,
- improper installation,
- damages resulting from improper packaging by the customer.

Any repair work, battery replacement, modifications, and extensions are exclusively performed by Salzbrenner Stagetec Audio Video Mediensysteme GmbH or an authorized person or institution.

3 Warranty

3.1 Introduction

C.A.S. Analyzer is manufactured using exclusively selected high-quality components. Each device undergoes a 100% production check. Thus, it is guaranteed that every product is shipped in an absolutely perfect condition.

3.2 Warranty

Salzbrenner Stagetec Audio Video Mediensysteme GmbH warrants to the original purchaser that the product is free from defects in material and workmanship for the period commencing upon the date of purchase and continuing for the following period of time after that date for 12 months. During this period, Salzbrenner Stagetec Audio Video Mediensysteme GmbH is entitled

- to repair,
- to replace with a repaired product,
- to replace with a product of the same or a better functional quality,
- to return the purchase price after receiving the defect product,

any defective product.

A copy of the original sales receipt must be produced for any service under warranty.

3.3 Warranty Limitations

Salzbrenner Stagetec Audio Video Mediensysteme GmbH does not give any further express or implied warranty for the product in question. Salzbrenner Stagetec Audio Video Mediensysteme GmbH expressly denies any implied warranties that this product is of conventional quality and will be fit for a certain purpose.

Some states do not allow limitations of how long a warranty lasts, so above limitations may not apply to the purchaser. In this case, however, the implied warranty that this product is of conventional quality and will be fit for a certain purpose is limited to 12 months, as this written warranty is.

4 Installation

4.1 Location

This device must be mounted into a 19“ rack. Make sure to observe the safety instructions given above when mounting the device.

In addition to and beside the safety instructions, make sure to observe the following:

- The surrounding temperature at the selected location – and inside the mounting rack, too – must not exceed 40°C/104°F. If necessary, install a rack ventilation or air-conditioning system.

  Please note that strong heat sources such as power amplifiers (especially when mounted below the device) may make the surround temperature surpass the critical mark, even if the average temperature in the rack is below 40°C.

- The installation location must not be exposed to dust or high humidity.
- The device must not be exposed to direct sunlight.
- Make sure to prevent the backplane connectors from direct access during operation as dangerous voltages may occur there.
- The ventilation slots must never be covered by other installed devices. For this purpose, we recommend to leave an empty 1-U space on top of the device and close it with a blind.
- The location must never be exposed to strong vibration.

4.2 Unpacking

1. Take the mains cable from the box.
2. Remove the package material on the device.
3. Take the device out of the box and position it top-down on a flat surface.
4. Open the plastic bag.
5. Hold the device with one hand and the bag with the other one. Pull the device fully out of the bag.
6. Position the device bottom-down on a flat surface.

4.3 Checking the Included Items

Included items

Make sure that all of the items listed were included in the box:

1. C.A.S. Analyzer
2. mains cable
3. Plug connector set
4. CD-ROM with PDF-User Manual

If any of these items is missing or defect, please contact your dealer **immediately**!

4.4 Rack Mounting

Put the device into the rack and fix its front panel using four M5 or M6 screws *(not included)*.

Use appropriate plastic washers to prevent front-panel damages when fixing the device.

5 Features

C.A.S. Analyzer is the controller unit and the core component of a C.A.S. speaker/amplifier/line-monitoring system. It features no control elements (not even a power switch). All parameters are set using an optionally available offline-configuration software and are transferred to the device using a PC. Afterwards, the PC is disconnected, thus ensuring that no parameters can be modified during operation.

The special features of the C.A.S. Analyzer are:

1. **Function-monitoring of 8+2 amplifiers with failure-routing capabilities**

   The C.A.S. Analyzer constantly monitors up to eight amplifiers, each connected to one of eight speaker lines, plus up to two spare amplifiers for proper operation. If one of the line amplifiers fails, the C.A.S. Analyzer will automatically route the respective line to an spare amplifier.

   The C.A.S. Analyzer can distinguish between failed amplifiers and short-circuit lines as long as at least one emergency amplifier is available: if a speaker line is short-circuited, no emergency amplifier will be used for that line.

2. **Checking 8 speaker lines for ground leakage**

   All of the eight speaker lines can be checked for ground leakage (less than 50 kΩ).

3. **Controlling and querying up to 1024 SCBs / LCBs**

   Each speaker that is connected to one of the up to 1024 SCBs / LCBs (Speaker-Control Boards) can be monitored for short-circuit and disconnection. If the C.A.S. Analyzer is used in combination with a C.A.S. Master, it will additionally control the switches and control relays incorporated on the SCBs / LCBs (option).

4. **Four optocoupler inputs for indicating external events**

   All of the four optocoupler inputs are electrically separated from each other and from any other device components. They are used for indicating external events that can be input as active HIGH or active LOW.

5. **DCF77 clock-signal receiver and quartz-controlled clock**

   A quartz-controlled clock is provided for scheduled speaker/amplifier/line checks and for having a time reference on the error-log printout. If the DCF-77 time signal can be received, the integrated DCF-77 receiver can be used instead (requires the optional active antenna).

6. **Error-log printout**

   Every error detected by the C.A.S. Analyzer including its date and time can be transmitted to a matrix printer. This also applies to enabling and disabling the optocoupler inputs. The user can set up a special message for each possible error.

7. **Relay output for remote failure indication**

   Five potential-free relay contacts are provided for remotely indicating any failure to the control center. The relays correspond to the respective front-panel indicators.

8. **Interface to the C.A.S. Master**

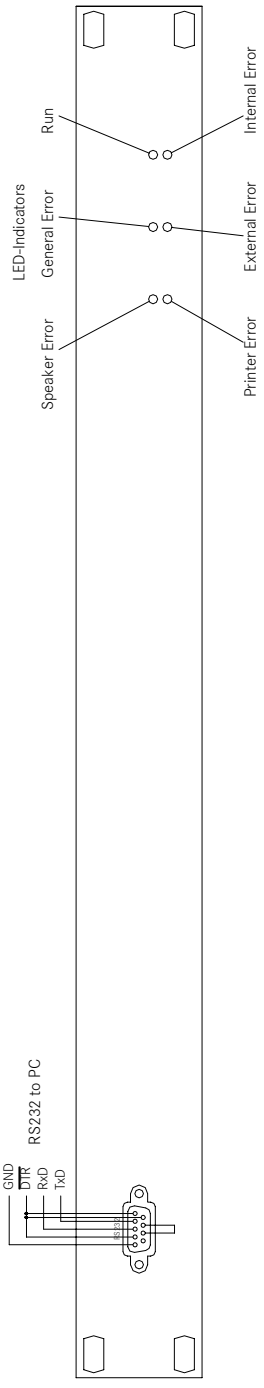
   The Analyzer can be connected to a C.A.S. Master using the RS485-bus interface. Thus, it can receive control data for SCB / LCB switches and control relays and transmit error information to a personal computer.

9. **RS232 interface for PC connection (standalone mode)**

   If the C.A.S. Analyzer is operated without a Master unit, a personal computer can be connected to the RS232 interface for configuration and logging purposes.

6 Connections and Operation

6.1 Front-Panel Elements



The front panel features six indicators: a green power LED and five red error LEDs indicating malfunctions. The D-Sub connector is used exclusively for computer-data transmission.

6.1.1 Power LED

The green LED shows the operating status. The following cases are possible:

1. The LED is off

Possible reasons:

- The device is turned off.
- The main processor has failed.

2. The LED is flashing.

Possible reasons:

- C.A.S. Analyzer is being configured.
- A connected C.A.S. device has just been turned on or has been reconnected to the bus after disconnection.

3. The LED is lit.

C.A.S. Analyzer is in operation.

6.1.2 Internal-Error Indicator

This LED indicates internal malfunctions and will light when

- no data connection to the C.A.S. Master could be established (not in standalone mode),
- no DCF77 signal is received (if this signal is set up for use),
- the RAM was cleared due to a low battery,
- no data connection to the C.A.S. Generator could be established,

- the 20-kHz oscillator of the Generator has failed,
- the address switch on the rear panel has been improperly set.

Further, when the configuration file contains a setting that the DCF77 receiver is used, this LED will light after switching on the Analyzer until two successive complete time signals have been properly received. This may take up to three minutes even at good receiving conditions.

After a valid time has been received, the clock will be corrected only at 2 o'clock and 3 o'clock. These are the only times when signal failure can be detected.

If speaker and power-amplifier monitoring have been disabled in the setup file, the Generator will not be checked for errors, so the Error LED will not light if the data line to the Generator has been broken, or if the oscillator has failed.

6.1.3 External-Error Indicator

This LED will light if any of the four optocoupler inputs is enabled. "Enabled" means that an input configured as "active HIGH" receives a signal, or an input configured as "active LOW" does not receive a signal.

6.1.4 General-Error Indicator

This LED will light if one or more lines show ground leakage (i.e. with a resistance of less than 50 kΩ) or are short-circuited, or when one or more amplifiers have failed.

If the Generator is defective, no speaker and amplifier monitoring will be performed. With intermittent testing, the error indicator will only be updated after a checking process has been completed.

6.1.5 Speaker-Error Indicator

This LED will light if any of the speakers connected is short-circuited, or if any speaker coil is fused. If the Generator is defective, no speaker and amplifier monitoring will be performed. With intermittent testing, the error indicator will only be updated after a checking process has been completed. This does, however, not refer to the actual SCB / LCB check, meaning that if the data connection to any SCB / LCB fails, this will be indicated immediately. Still, if such malfunction has been fixed, the corresponding signal will be indicated only after the subsequent speaker check.

6.1.6 Printer-Error Indicator

If the printer has been set up as error-logging device, this LED will light when the printer is not ready for operation (i.e. switched off, not online, no paper or paper jam, etc.).

6.1.7 PC Connector

The Sub-D connector is provided exclusively for connecting a PC for configuration-data transmission to the device. Further, any connected PC can also be used for error logging regardless of whether any errors are simultaneously logged using the printer.

The Analyzer holds the most recent 512 error messages in memory, so these can still be subsequently transmitted to the PC or to the printer.

We recommend keeping the printer or computer (whichever is used for logging) permanently online, especially if the time when an error occurs is a key factor. This is because the date and time provided with an error message always refer to the time when the error is found. The printer uses the time setting provided by the RTC or the DC77 receiver on the Analyzer, the PC uses its own system time.

The signal is compatible to the RS232C standard. The connector wiring allows to directly connect a PC equipped with a 9-pole RS232 connector to the C.A.S. Analyzer using a conventional Sub-D extension cable (plug – connector).

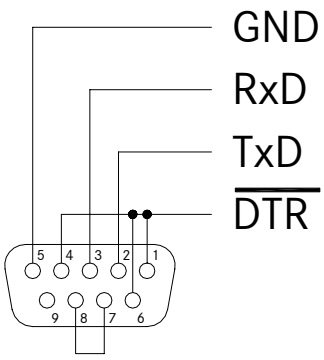
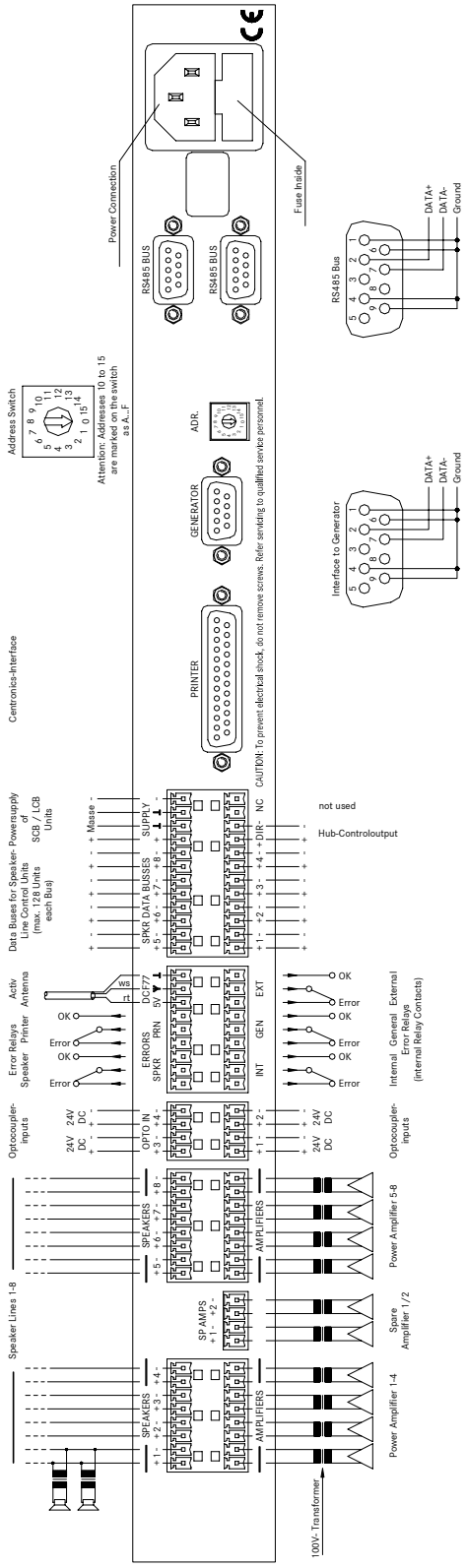


Table 1: Wiring Sub-D cable – PC

Analyzer	PC (9-pole)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

6.2 Rear-Panel Elements



The figure shows all rear-panel connectors and the respective wirings.

Make all connections before connecting the device to the mains.

Please observe all instructions relating to the individual connectors in the following chapters.

If the mains fuse needs to be replaced, make sure to read the chapter 9.2 “Replacing the Mains Fuse“ before proceeding.

6.2.1 Amplifier and Speaker Connectors

Eight power amplifiers featuring a potential-free 100-V output can be connected to the Amplifiers connectors. These amplifiers are used for driving the respective Speakers connectors. Make sure that also the speaker lines do not show ground leakage; all speakers used must include 100-V transmitters. (This is true especially SCBs / LCBs are employed.)

The SP Amps connectors are used for connecting two emergency amplifiers that the Analyzer can change over to in case that one or two of the line amplifiers 1...8 fail. Here, too, the used amplifier outputs must be potential-free.

6.2.2 Optocoupler Inputs

All optocoupler inputs are electrically separated from each other and from the rest of the device. Apply a 24-V DC voltage to any of the optocoupler inputs for enabling it. Disabling is made by applying DC voltages between 0...0.5 V. No pre-resistors are required.

Each or any of the optocoupler inputs can be individually programmed to respond to “active LOW”, meaning that they become disabled when feeding a +24-V voltage and become enabled if no voltage (0 V) is applied.

If any of the four optocoupler inputs is enabled, the EXT ERR front-panel indicator will light, and the corresponding relay will drop out.

Pay attention to proper voltage polarization. Wrong polarization may damage the device. Further, make sure that your voltage source supplies the current required for driving the optocouplers. For further information, refer to chapter 10.1 „Electrical Specifications“.

The optocoupler inputs are not suitable for network detachment but are integrated to prevent ground loops caused by voltage drops on long leads. Therefore, connect potential-free sources only.

6.2.3 Error Relays

The error relays provide a potential-free relay contact indicating any errors to a control center. A potential-free relay is available for each error class. The Error position is assumed when the relay is dropped out. Therefore, an error will also be produced when the C.A.S. Analyzer is not connected to the mains.

All further error situations are indicated in the same way as by the front-panel indicators. (Refer to paragraphs 6.1.2 - 6.1.6 for details.)

This kind of potential separation is not suitable for network separation but is integrated to prevent ground loops caused by voltage drops on long leads. Therefore, connect potential-free sources and loads only.

Observe the minimum and maximum voltages and the maximum error-relay load current (see chapter 10.1 „Electrical Specifications“).

6.2.4 Antenna Connection

An active receiver antenna adjusted to the DCF77-station broadcasting frequency can be connected here. The antenna mechanism demodulates the received signals and outputs them as an open-collector TTL signal. The pull-up resistor required for the open-collector output is already integrated into the C.A.S. Analyzer. A stable operating voltage of +5 V for the antenna is supplied by the C.A.S. Analyzer.

The antenna output signal must be able to generate a logic LOW-level output of the DCF77 signals; refer to the diagram below:

Warning!

Connect one single receiver antenna only to this connector. Observe the maximum antenna load (refer to section 10.1 „Electrical Specifications“).

The antenna connector must not be short-circuited. A short-circuited aerial cable may lead to cable or device overheating and may cause a fire. In addition, parts inside the device or the antenna may be damaged or destroyed.

6.2.5 SCB / LCB Connectors

6.2.5.1 Communication Connectors

There are altogether eight data busses (“SPKR DATA BUSSES”), and 128 SCBs / LCBs can be connected to each of them. All data busses are equal, meaning that there is no allocation of the data busses to the 100-V speaker lines.

The signal is balanced and features a maximum stroke of ±2.5V. The communication busses are electrically separated from the Analyzer but share the same voltage source and mass. They are supplied via the SUPPLY connectors.

Communication with the SCBs / LCBs is established using the semi-duplex method. The signal output by the Analyzer is generated by a UART and has a data rate of 9,600 baud.

Warning!

Use only shielded cables for wiring the communication busses. Failing to do so may result in interference emission affecting the operation of neighboring devices.

6.2.5.2 Voltage Supply

The operational voltage (that also supplies the SCBs / LCBs) must be fed to the SUPPLY connectors. Both balanced and unbalanced voltages can be input here.

6.2.5.3 Hub Control

A hub can be fed to the DIR connectors in case that more driving power or more than eight data-bus connectors are required.

The signal is balanced and features a maximum stroke of ±2.5V. The DIR connectors are electrically separated from the Analyzer but share the same voltage source and mass with the data busses. They are supplied via the SUPPLY connectors, too.

6.2.6 Printer Port

Any printer equipped with a Centronics® interface can be connected to the printer port. We recommend using a matrix printer as the Analyzer does not transmit form-feed characters, so messages may be printed only after performing a manual form feed (or may not be printed at all), if a form-based printer such as a laser printer was employed.

Table: Printer-Port Wiring

D-Sub pole (Analyzer)	Printer pole	Signal	Direction
1	1	/Strobe	to printer
2	2	Data 0	to printer
3	3	Data 1	to printer
4	4	Data 2	to printer
5	5	Data 3	to printer
6	6	Data 4	to printer
7	7	Data 5	to printer
8	8	Data 6	to printer
9	9	Data 7	to printer
10	10	/Acknowledge	to Analyzer
11	11	Busy	to Analyzer
12	12	Paper Empty	to Analyzer
13	13	Select	to Analyzer
14	14	/Auto Feed XT	to printer
15	32	/Fault	to Analyzer
16	31	/Input Prime	to printer
17	36	/Select In	to printer
18-25	19-30,33	Ground	-
chassis	chassis,17	Chassis Ground	-

6.2.7 Generator Interface

Connect a single C.A.S. Generator unit to this connector. Any 9-pole D-Sub cable featuring a shield connected to the D-Sub plugs on either end can be employed as connecting cable.

Warning!

Use shielded cables only. Failing to do so may result in interference emission affecting the operation of neighboring devices.

6.2.8 Address Switch

Sets the address of the C.A.S. Analyzer.

If multiple Analyzer units are used in connection with a C.A.S. Master, each unit must have its unique address. Select any address between 1...8 (the addresses 0 and 9...15 are not valid).

If the Analyzer is operated in standalone mode, select address 1!

Note: The addresses 10...15 are marked as A...F on the address switch.

6.2.9 RS485 Bus

The C.A.S. Analyzer can be connected to a C.A.S. Master via the RS485 bus. Two RS485 connectors are provided for simplifying a serial connection to other C.A.S.-series units. Note that this bus is not universally employable but its use is limited to C.A.S. devices.

Any 9-pole D-Sub cable featuring a shield connected to the D-Sub plugs on either end can be employed.

Warning!

Use shielded cables only. Failing to do so may result in interference emission affecting the operation of neighboring devices.

6.2.10 Mains Connector and Fuse

If you have not yet read the Safety Instructions in chapter 1, we urgently recommend you to do so **now**!

Before replacing the mains fuse. please make sure to read the notes in chapter 9.2 “Replacing the Mains Fuse“.

Connect the supplied power cable to the corresponding input to connect the C.A.S. Analyzer to the mains.

If you want to use a different cable, make sure that this cable is equipped with a 3-pole plug. Connect it only to a properly earthed power point. Never use any adapters. Never tape the ground contact. When using an extension cable, use a 3-core cable only. Make sure to keep to the mains voltage printed on the device; failing to do so may result in heavy damage to the device.

6.3 Initial Operation

1. Set up a configuration using the optionally available configuration software and a personal computer. For more information, refer to the software manual.
2. Establish all signal connections to the C.A.S. Analyzer.
3. (If using the Analyzer in standalone mode:) Connect your PC to the RS232 front-panel connector and set the device address to 1 using the rear-panel address switches.
4. (If using the Analyzer in system mode:) Connect your PC to the RS232 front-panel connector and select the appropriate device address using the rear-panel address switches.
5. Connect all system components to the mains.
6. If not done yet, run the configuration software and load the configuration file.
7. (If using SCBs / LCBs:) Initiate serial-number scanning and make sure that there are no inconsistencies between configured serial numbers and installed SCB / LCB units.
8. Transfer the configuration to the device. If any problems occur, make sure to read the Troubleshooting section (chapter 8.1 „Configuration Errors“).

   Note: The transfer may take several minutes. The green power LED on the C.A.S. Analyzer front panel will be flashing while it is in progress.

9. When the “Transmission completed“ message is displayed, the configuration process is complete. The power LED of the C.A.S. Master should now be constantly lit. If you do not use SCBs / LCBs, skip to step 12.
10. Set the SCB / LCB sensitivity. For this purpose, make sure that no signals are present in the system as this may affect the subsequent measuring.
11. Select the Send SCB / LCB Parameters menu item and wait for data transmission to complete.
12. If the use of the DCF77-time signal has been configured, the INT ERR indicator may light. The LED should go dark when the DCF receiver has acquired a valid time signal (this can take up to three minutes). All system components should now be ready for operation, so all error LEDs should be off. Otherwise, read section 8.2 „Operational Troubleshooting“.
13. If the DCF receiver is not used, set the real-time clock to the current time and date.
14. If you do not use the computer for logging purposes, quit the configuration software and disconnect the transmission cable from the C.A.S. Analyzer. The system is now ready for operation.

Note: The error indicator of the C.A.S. Generator will be lit while the Analyzer is in configuration mode (that is, the power LED is flashing). This is not a malfunction! If no other failure as occurred, the error LED will go dark again after the configuration has been completed.

6.4 Standard Operation

No user actions to the C.A.S. Analyzer are required for further operation. Any malfunctions will be indicated by the front-panel LEDs and be transmitted by the error relay, if properly connected, to the control center. In addition, a detailed error log can be had transmitted to a printer or a computer. Refer to chapter 8.2 „Operational Troubleshooting“ on how to fix malfunctions.

7 Functionality

This chapter provides detailed information on the way of operation of an overall C.A.S. speaker-monitoring system.

7.1 Components of a Speaker-Monitoring System

The installation that provides comprehensive speaker, amplifier and line monitoring contains the following components:

- C.A.S. Analyzer
- C.A.S. Generator
- C.A.S. SCB / LCB (Speaker Control Board) for each speaker to be controlled (up to 1024)
- up to ten power amplifiers
- one or more power supplies for the SCBs / LCBs

The Generator applies an inaudible pilot tone to the audio signals that are passed through to the up to eight line amplifiers and one or more emergency amplifiers. The amplifier outputs are connected to the Analyzer that in turn transfers the amplifier-output signals to the respective speakers. The Analyzer not only evaluates the signals received from the power amplifiers but the SCBs / LCBs measure the individual currents of each speaker and return the results to the Analyzer. The Analyzer will transmit any events to a printer or personal computer. (The events do not only include malfunctions but also resolutions of these malfunctions.)

7.2 Modes of Operation

7.2.1 Standalone Mode

“Standalone mode” refers to a system configuration where the speaker-monitoring system is not connected to a C.A.S. Master. In this case, the Analyzer will transfer all clear-text messages to a printer or a directly connected PC.

The computer is also used for configuring the system. It is, however, not necessarily required for normal operation. If error logging and indication is not made using the computer, you may disconnect it after performing the system configuration.

The SCB / LCB relays cannot be utilized in standalone mode as there is no option for transmitting relay-control information to the Analyzer. Therefore, either use SCBs / LCBs without relays in this setup, or establish a hardware solution for bypassing the relays.

7.2.2 System Mode

When the Analyzer is used in combination with a C.A.S. Master unit, the Analyzer outputs clear-text messages to a printer and/or the Master. (This is referred to as “system mode”.) If you want to have the clear-text messages output to a PC, connect it to the Master. Next, the Analyzer configuration is performed also via the Master interface, so no additional operations are required.

If error logging and indication is not made using the computer, you may disconnect it after performing the system configuration.

Using the Analyzer in combination with a C.A.S. Master and the respective peripherals significantly enhances the system functionality. For example, the selective SCB / LCB router (optional) and the control relays can be addressed from a C.A.S. pager; this is useful if you want to select between two different 100-V signals (e.g. background music and announcements) in operation. Other options include controlling light signals distributed in the addressed area; this is achieved by defining up to 64 paging circuits and up to 128 control relays.

7.3 Test Intervals

Speaker, amplifier and line monitoring can be performed either constantly or intermittently, or may be entirely disabled.

With intermitting testing, errors and malfunctions are found only when the test is being performed. So if you set up a test interval of one hour, an amplifier or speaker may fail, and this failure may be recognized only an hour later (in case that the failure occurs immediately after a test). Therefore, continuous monitoring is recommended for critical applications. In this case, the time taken for the monitoring depends only on the system size (i.e. how many configured speakers are present) and varies between a few seconds and less than a minute.

The availability of the connected SCBs / LCBs can be checked within seconds even with intermittent testing enabled thanks to a continuous self-monitoring. Therefore, a message indicating the overall failure of an SCB / LCB may be displayed even between the actual tests. The system will, however, indicate the functionality re-establishment only at the following test as the fact that an SCB / LCB has been repaired does not prove the connected speaker to be fully functional. Therefore, the actual status of the respective speaker will be displayed together with the re-establishment confirmation at the subsequent test.

Test intervals between 10 minutes and 24 hours can be set. The first test starts immediately after the device has been turned on, or when the configuration process has been terminated. The intervals determine the time between two tests. As the test itself takes a few seconds, the actual interval is a bit longer.

7.4 System Self-Monitoring

All components of the speaker-monitoring system are continuously monitored. This includes

- proper communication and oscillator operation of the Generator (unless the monitoring function was disabled during the configuration process),
- the communication line to the C.A.S Master (only in system mode),
- proper data communication and adequate relay settings of all SCBs / LCBs,
- proper printer operation (if printout has been configured),
- enabled optocoupler inputs.

If speaker and amplifier monitoring is enabled (regardless of whether constant or intermittent operation has been selected), the Generator is continuously checked for operation and internal errors. If this monitoring function is disabled, the Analyzer will not query the Generator, which causes the Generator's error indicators to light (unlike the Analyzer's indicators).

If the communication line between the Analyzer and the C.A.S Master is broken in system mode, the Analyzer will detect this fact within seconds. In standalone mode, however, the communication line to the PC will not be checked as the PC is used for error logging anyway in this constellation, so it will indicate the broken line immediately.

The SCBs / LCBs, too, are continuously monitored independently of the set test intervals. Thanks to the cyclical relay-status update in system mode, any SCBs / LCBs previously disconnected from power or those with formerly broken data lines can automatically actualized with no user operation required.

7.5 Speaker Monitoring

7.5.1 Principle

The speakers can be either constantly monitored or intermittently tested. We recommend you to enable the monitoring facility as this reveals all malfunctions directly, allowing for immediate repair. If, however, intermittent testing is selected, the pilot tone will be disabled whenever testing is not being performed; this functionality was implemented for reducing amplifier load, however, the impact is minimal.

If the Analyzer is operated in system mode and none of the SCB / LCB selective-routing relays is closed, one of these relays will be enabled. Then, the pilot tone will be enabled or faded in. If the levels of all pilot tones are established, the Analyzer checks the amplifiers for availability and changes to an emergency amplifier, if required.

Afterwards, a current measurement is initiated on all SCBs / LCBs where the share of the current run through each speaker that is caused by the pilot tone is measured. All speakers not fed by an operational amplifier will not be checked as this would result in non-representative values. This is the reason why it is important that the Analyzer is aware of

which speakers are connected to which amplifier; otherwise, it would indicate a number of wrong errors. If a malfunction occurs at the Generator, no test will be performed.

After a certain amount of time, the SCBs / LCBs will be queried. Then, the pilot tone will be disabled or faded out if intermittent testing is on. In system mode, the Analyzer will then drop out the selective-routing relays.

7.5.2 Speaker-Current Assessment

The assessment of the speaker status is performed in multiple steps:

1. **Measuring of the peak-to-peak load current (I_{ss})**
   The current run through the speakers is measured using an A/D converter. The lowest and highest values of multiple successive measuring processes are noted. If the maximum and minimum values do not significantly change within a certain number of successive measuring processes, these values will be regarded as constant.

2. **Performing of multiple I_{ss} measurements and determination of the mean value**
   Multiple measuring sets must be performed, and the arithmetic mean must be determined, in order to increase the reliability of the found values. This eliminates transient components of the utilized signal that contain levels or frequencies similar to the pilot-tone parameters.

3. **Result evaluation**
   The thus determined resulting load current of the speaker is then compared to the idling and short-circuit limits. If the value falls below idling limit, the SCB / LCB will be marked as “moving coil idling”; if the value exceeds the short-circuit limit, the SCB / LCB will be marked as “moving coil short-circuited”; if the value is within the limits, the SCB / LCB will be marked as “speaker ready”.

4. **Exclusion of “sporadic“ error messages**
   The thus evaluated results will not be transmitted to the Analyzer but will be stored internally. The SCB / LCB will stack multiple results to see how often the various statuses are found. A couple of idling and short-circuited statuses would mean that the speaker is okay but the pilot tone is “trembling”. This case would be compensated internally by the SCB. An error message will be generated only if more than 50 per cent of the results show the same tendency (idling/short-circuit).

7.5.3 Notes

During the configuration, all SCBs / LCBs are aligned to the respective speakers. Afterwards, neither the pilot-tone level nor the power-amplifier faders must be changed; otherwise, repeat the alignment procedure.

If a defective SCB / LCB has been replaced, enter the new SCBs / LCBs serial number into the configuration software, reconfigure the Analyzer, and finally perform an alignment.

Neither utilized nor interfering signals (with the exception of the pilot tone) must be played during alignment as this would render the reference measuring false.

7.6 Amplifier and Line Monitoring

7.6.1 Short-Circuit Recognition and Emergency Routing

Whenever the speakers are tested, the amplifiers and lines are checked, too. For this purpose, the C.A.S. Analyzer checks every speaker output to see whether a voltage is present. If no voltage is available, either the amplifier is defective, or the line is short-circuited.

If an emergency amplifier is at hand, it will be routed to the line in question, and a message is transmitted to the Generator that this emergency channel must assume the input signal and the pilot-tone level of the channel to be substituted. If the emergency amplifier does not output any signal, the line is obviously short-circuited. In this case, the emergency amplifier is taken out of the signal path again, while the original amplifier is routed to line in question, and message 5 (“Line short-circuit”) is output. If, however, the signal is output from the emergency amplifier, the Analyzer sends message 9 (“Defective amplifier”).

If no emergency amplifier is at hand for this test, the Analyzer outputs message 11 (“Defective amplifier or broken line”) together with the numbers of the respective amplifier and line. The distinction between the amplifier and line numbers is necessary in order to see the failure of a line that has already been linked to an emergency amplifier.

If no emergency-amplifier channel is used, the assessment is simple: if no signal is received, the amplifier has failed. A pilot-tone level must be entered during configuration for emergency amplifiers, too, so that a pilot tone may also be routed to an unused emergency amplifier.

There is an option in the configuration file to set whether mono or stereo amplifiers are employed. With stereo devices, neighboring channels must be part of a single device, starting with channel 1. The difference is visualized by the way the emergency routing is achieved: if one channel fails, both channels of the device in question will be replaced by both channels of the emergency amplifier. This prevents the signal line from being broken a second time when the defective amplifier is substituted, because the second channel of the “semi-defective” device must be replaced by an emergency-amplifier channel anyway. If you do not desire this behavior (for example, because you do not want to lose the second emergency channel early), do not configure stereo amplifiers.

7.6.2 Ground-Leakage Recognition

During speaker and amplifier test, all lines are checked for ground-leakage resistance of less than 50k. For this purpose, a very low direct current is fed to the line, then the voltage drop to the ground shield is measured. A low-resistance DC path must be present between the individual cores of each speaker cable must be present for this function to work. This is ensured with 100-V transmitters.

The ground-leakage recognition facility will respond slightly delayed due to the heavy impact of AC-voltage filtering. The more the actual ground-leakage resistance is approaching the 50k value, the longer is this delay. In this case, there may be a response time of up to 10 seconds, that is, a ground leakage will be indicated approx. 10 seconds after the actual failure. If intermittent testing is selected instead of constant monitoring, the same limitations apply as with speaker and amplifier monitoring and with emergency-amplifier routing, i.e. all errors will be found only when the next test occurs.

7.7 Date and Time

The C.A.S. Analyzer features both a quartz-controlled RTC (Real Time Clock) and a receiver for DCF77 time signals. These clock features are required for intermittent testing to determine when tests occur; besides, date and time are printed on the logging report that can be transmitted to a matrix printer via the incorporated Centronics® interface.

If you do not want to use the DCF77 time feature, or if you are not able of using it (for example, because you cannot receive a valid time signal), set the RTC manually using the configuration software. If you do use the DCF77 time feature, the DCF77 time setting is written to the RTC, which will afterwards be used for bypassing any receiver malfunctions.

If the DCF77 time is set up for use, a reception signal will be sent whenever the Analyzer is switched on. This is a normal operation as the time telegraph is sent only once in a minute, and two successive telegraphs must be evaluated before a definite statement can be made about the reception quality (the Analyzer presupposes an insufficient reception until the contrary has proved true).

If no valid DCF77 signal could be received within three minutes after turning on the Analyzer, the receiver stops evaluating the antenna signal. It will afterwards try to get a valid signal every hour. If a valid time signal could be acquired once, the Analyzer indicates message 33 (“Valid DCF Reception”). As of that time, the receiver corrects its time setting every hour to the DCF77 time grid. Any subsequent reception failure will be checked for and indicated only at 3 a.m.

7.8 Error Indication

7.8.1 Error Indicators and Relays

The front-panel LEDs of the Analyzer assign every occurring error to one of five groups. The LED statuses can also be transmitted from a rear-panel connector as potential-free relay contacts. The Error setting corresponds to the respective relay having dropped out. (This also means that an Analyzer disconnected from the mains indicates an error for each category).

The errors assigned to the respective LEDs and relays are listed in section 7.8.3 „Messages“.

7.8.2 Printer/Computer Logging

All errors can be transmitted to any line printer (e.g. a matrix printer) featuring a Centronics® interface. We recommend using a matrix printer as the Analyzer does not transmit form-feed characters, so messages may be printed only after performing a manual form feed (or may not be printed at all), if a form-based printer such as a laser printer was employed.

Both the amplifier-channel names and the error-message texts can be freely configured. The Analyzer will only insert numerical characters into the text, thus not affecting customized error messages (for example, error messages in different languages).

The Analyzer writes the most recent 512 error messages into an internal memory, so it is highly improbable that messages get lost when the printer paper is replaced. However, messages that have already been moved to the printer cache will not be transmitted a second time; therefore, do not turn off the printer even when servicing it.

Logging the errors messages to a printer or a PC is an adequate means of localizing errors and their causes immediately and precisely. Depending on the actual type of error, the Analyzer sends the amplifier and line numbers, the SCB / LCB serial number(s), and individual messages whenever the optocoupler inputs are enabled or disabled respectively.

Similar to printing, all messages may also be transmitted to a PC (even in addition to printing). Also, the PC checks the communication line to the Analyzer and will show a message, if appropriate.

The most recent 512 messages will be stored in the Analyzer's internal memory for PC communication, too, regardless of whether they have already been printed or not. This allows for you to subsequently connect a PC for error checking even when a control center has already announced a malfunction. If less than 512 events have occurred since the last query, this list will be complete; otherwise, the oldest entries will have been deleted.

When the Analyzer is switched on, this error-message list (as well as the error list of the printer) will be cleared. The Analyzer will, however, check all configured components for errors and set up a new error list, thus providing you with information on the current status of the overall system.

The date and time given in the messages always relate to the time when an event was announced. This means that the exact event time can be seen only if a printer or computer is constantly online and connected to the Analyzer.

7.8.3 Messages

The following list provides you with an overview on the messages that may be transmitted by the Analyzer.

No.	cat.	parameter	event
1	SPKR	serial number	speaker short-circuited
2	SPKR	serial number	speaker is blown
3	SPKR	serial number	speaker ready
4	SPKR	serial number	SCB / LCB does not respond
5	GEN	line number	short-circuit on line
6	GEN	line number	ground leakage on line
7	GEN	line number	short-circuit fixed
8	GEN	line number	ground leakage fixed
9	GEN	amplifier number & name	amplifier defective
10	GEN	amplifier number & name	amplifier ready
11	GEN	amplifier/line number	line short-circuit, or defective amplifier
12	SPKR	group number	speaker group short-circuited
13	SPKR	group number	speaker group fused
14	SPKR	group number	speaker group ready
15	SPKR	group number	SCBs / LCBs in speaker group do not respond
16	EXT	-	optocoupler input 1 enabled
17	EXT	-	optocoupler input 1 disabled
18	EXT	-	optocoupler input 2 enabled
19	EXT	-	optocoupler input 2 disabled
20	EXT	-	optocoupler input 3 enabled
21	EXT	-	optocoupler input 3 disabled
22	EXT	-	optocoupler input 4 enabled
23	EXT	-	optocoupler input 4 disabled
24	INT	-	Generator ready
25	INT	-	oscillator defective
26	INT	-	Generator communication error
27	INT	-	Generator does not respond
28	INT	-	Master does not respond
29	INT	-	Master communication error
30	INT	-	Analyzer was turned off
31	INT	-	Analyzer was turned on
32	INT	-	No DCF77 signal
33	INT	-	valid DCF77 signal
34	INT	-	wrong address-switch setting
35	INT	-	memory cleared (battery low)
36	PRN	-	no printer paper
37	PRN	-	printer paper re-fed
38	PRN	-	printer not ready
39	PRN	-	printer ready

The **cat.** column shows which LED will light, or which error relay will drop out, in case that this error occurs.

The **parameter** column shows the meaning of the numerical value added to the message by the Analyzer. The messages 1...15 consist of two parts that the parameter is inserted between. Each of these parts may contain up to 31 characters. All other messages are single-part and may consist of up to 63 characters.

The messages will normally have the following format:

```
date        time        message [parameters, message suffix]
```

For example:

```
15.10.97    19:10:25    speaker 22078 failed
15.10.97    20:20:21    amplifier 1 (entrance) failed
```

A maximum of 80 characters per line can be printed. If the line was longer than 80 characters, the Analyzer will add a line feed before the word that would exceed the line length.

Message 11 indicates both an amplifier and a line number as a distinction between an amplifier error and a line error is not possible in this case. The group numbers indicated in messages 12...15 refer to speaker groups configured in system mode. (In standalone mode, this number is the same as the line number that the speaker is connected to.) These messages were implemented for reasons of clarity because a collective message will be displayed if all speakers of a group fail for the same reason.

The printer will indicate message 30 immediately after the Analyzer has been switched on. (The time when the device was turned off last time was stored internally.) This is the only message where date and time do not correspond to the time of printout.

7.9 Selective Routing/Control Relay

The (optional) relays on the up to 1.024 SCBs / LCBs can be addressed by the Analyzer in system mode.

For selective routing, all SCBs / LCBs are assigned to one of up to 64 groups. The selective-routing facility provides routing of one out of two 100-V signals to all speakers of one group. (This can be compared to a C.A.S. Kreisrelaisbox [circuit-relay box] featuring two inputs and 64 outputs.)

Using this facility, a call can be routed to dedicated speaker groups without affecting the background music played by the other speaker groups. Another application would be the simultaneous transmission of two calls in different address zones.

As there are now two 100-V channels that may both be disabled at the same time by a single speaker under certain conditions, the following consequences for speaker monitoring/testing emerge:

1. **There is 1 calling channel.**

With constant monitoring, the calling channel is always on, while it will be enabled only during the tests when intermittent testing has been selected. If a call is broadcast to individual speaker groups (zones), the relays of the groups not selected will drop out anyway. Therefore, no monitoring/testing will be performed for these unselected groups during the testing period.

2. **There is 1 program channel and 1 calling channel.**

Monitoring/testing is performed via the program channel, if it is enabled. The other speaker groups, where the program channel is disabled, will be monitored/checked via the calling channel. For this purpose, if intermittent testing has been selected, the calling channel will be enabled for the testing period, while it is always on with constant monitoring selected.

If a call is broadcast, all speaker groups selected for this call will change to the calling channel; the monitoring/testing will then be performed via the calling channel. The relays of all zones, that are not selected for the call and do not play the program signal, will drop out anyway. Therefore, no monitoring/testing is provided for these groups during the call.

3. **There are 2 calling channels.**

Speaker monitoring/testing is made via calling channel A that is always on with constant monitoring, but will be enabled only for the testing process when intermittent testing has been selected. If a speaker is routed to calling channel B, monitoring/testing is performed via this channel. If two calls are broadcast at the same time, the call relays do not drop out at any of the SCBs / LCBs in question; that is, no monitoring/testing will be performed during this time.

Next, up to 128 individual control-relay contacts can be operated (one contact is available per SCB). This provides for handling universal control issues, for example, signaling. This facility can substitute one or more C.A.S. Steuerrelaisbox units (control-relay boxes).

7.10 Optocoupler Inputs

The four optocoupler inputs are queried in short intervals (approx. every 20 ms). If any of the inputs is enabled, the EXT ERR indicator on the front panel will light, and the corresponding relay drops out.

Any of the optocoupler inputs can be individually programmed to respond to “active LOW”, meaning that it becomes disabled when feeding a +24-V voltage, and becomes enabled if no voltage is applied. Inputs that are not required should be set to active HIGH.

For each input, one message can be configured for when the input is disabled and a second one for when it is enabled can be configured, i.e. there are altogether eight different messages for indicating events at the optocoupler inputs.

7.11 What Happens During Configuration?

7.11.1 Serial-Number Scanning

This process is performed for your information only. It allows determining whether your configuration settings are correct, thus providing for fixing any errors before loading the configuration file.

7.11.2 Loading the Configuration File

The configuration file contains all information the C.A.S. Analyzer requires for operation. This includes

- number and type of the connected amplifiers,
- general monitoring parameters (pilot-tone level, intervals, etc.),
- the serial numbers of the connected SCBs / LCBs,
- message texts and amplifier names,
- printer and DCF77-receiver shares,
- optocoupler-input modes operation.

During loading, the Analyzer assigns short addresses to the SCBs / LCBs, so it can access them quicker in operation.

The Generator parameters are stored in the Analyzer as the Generator itself does not have a non-volatile memory. This means that no reconfiguration is required after replacing a defective Generator.

7.11.3 Parameters and Self Test

As a first step, the parameters entered into the Speaker parameter window of the configuration software are transmitted to the SCBs / LCBs (this does not include the Short-Circuit Limit and Idling Limit parameters).

Afterwards, a reference test is initiated on all SCBs / LCBs. During that test, the actual current run through each speaker is multiplied with a factor basing on the Short-Circuit Limit and Idling Limit parameters. This results in individual limits for each speaker that in turn will be transmitted back to the SCBs / LCBs.

8 Troubleshooting

8.1 Configuration Errors

8.1.1 Analyzer Cannot Be Found

This message may be displayed on the computer screen during configuration, if the PC cannot connect to the Analyzer.

Possible reasons:

1. The C.A.S. Analyzer is not connected to the mains.
2. The C.A.S. Analyzer is operated with an inappropriate mains voltage.
3. The data line between the PC and the C.A.S. Analyzer is not set up properly.
4. The data-cable connector from the C.A.S. Analyzer was connected to a PC port different from the one previously provided in the configuration software.
5. The address switches of the C.A.S. Analyzer have an improper setting.

Actions:

1. Make sure that the mains voltage printed on the rear panel of the C.A.S. Analyzer is identical to the actual mains voltage.
2. Make sure that the C.A.S. Analyzer is properly connected to the mains.
3. Check the data cable between the PC and the C.A.S. Analyzer. Make sure that the data-cable plug is properly inserted into the D-Sub connectors on the front panel of the C.A.S. Analyzer or Master.
4. Check whether the plug on the other end of the data cable is properly inserted into the serial port of the PC as previously entered in the configuration software (Port box in the Options window called from the Configuration menu).
5. Check the address-switch setting.
6. Repeat the configuration process.

8.1.2 A List of Errors Including Serial Numbers is Displayed

All SCBs / LCBs listed cannot be accessed.

Possible reasons:

1. The SCBs / LCBs are operated with an inappropriate supply voltage.
2. The devices are not connected to the voltage source.
3. The data line between the C.A.S. Analyzer and the devices was not established properly or was inadvertently broken.

Actions:

1. Make sure that all SCBs / LCBs in question are operated with the appropriate operating voltage. For his purpose, measure the voltage present at the last SCB / LCB of each line to make sure that the supply voltage does not fall below the required voltage due to voltage drops.
2. Check the data connection between the C.A.S. Analyzer and the SCBs / LCBs.
3. Repeat the configuration process.

8.1.3 Error Messages After Serial-Number Scanning

After performing serial-number scan, a list of SCBs / LCBs that are configured but missing, or that are physically present but not considered in the configuration, is output.

Possible reasons:

1. Missing SCBs / LCBs may have been disconnected from their respective voltage source or data line.
2. The configuration file contains wrong serial-number assignments.

Actions:

1. Check the data lines and operating voltages as explained in 8.1.2 „A List of Errors Including Serial Numbers is Displayed“.
2. Make sure that you have entered the correct serial numbers. Make corrections if necessary.
3. Repeat the scanning process.

8.1.4 The Power Indicator Keeps Flashing After the Configuration

This means that the C.A.S. Analyzer has not left the configuration mode yet.

Possible reasons:

1. The configuration process was cancelled because of an error.

Actions:

1. Try to load the time setting. If the C.A.S. Analyzer does not leave the configuration mode afterwards, disconnect it from the mains, then reconnect it.
2. Repeat the configuration process.

8.2 Operational Troubleshooting

8.2.1 Introducing Remarks

The C.A.S. Analyzer can log all error messages and fixes to a printer or a connected PC. Even if you do not want to use this feature, it may be useful to have a PC (for example, a laptop) at hand in order to be able to locate the reason of an error if necessary. For more information on how to proceed, refer to chapter 7.8.2 „Printer/Computer Logging“.

An error analysis on the exclusive basis of the front-panel error indicators is difficult to perform (especially in case of speaker failure). We therefore recommend the use of a PC or a printer.

8.2.2 The Unit Does Not Operate/The Power LED is Dark

Possible reasons:

1. Missing or improper voltage supply.
2. Defective unit.

Actions:

1. Make sure that the mains voltage printed on the rear panel of the C.A.S. Analyzer is identical to the actual mains voltage.
2. Check whether the C.A.S. Analyzer is properly connected to the mains.
3. Check the mains fuse and replace it as explained in chapter 9.1 „Inside Servicing“ if necessary.
4. If the device cannot be put into operation, contact a technician authorized by Salzbrenner Stagetec Audio Video Mediensysteme GmbH.

8.2.3 The Time Provided on the Printout is Incorrect

Possible reasons:

1. The real-time clock has not been set yet.
2. The C.A.S. Analyzer has not acquired a valid time signal yet.

Actions:

1. If using the DCF77 receiver, move the active antenna to a position with better reception and align it to the appropriate sender direction. Afterwards, temporarily disconnect the Analyzer from the mains, then reconnect it. If a time signal can be received, the INT ERR error indicator should go dark after approximately three minutes (unless there are more malfunctions). It is possible that multiple attempts must be performed in order to find the optimum antenna setting.

2. Connect the configuration computer to the Analyzer, run the configuration software, and make the appropriate date and time settings.

8.2.4 Erroneous Response by an Optocoupler Input, or No Response At All

Possible reasons:

1. Improper input voltage.
2. Improper input-voltage polarity.
3. The input type was improperly set.

Actions:

1. Check the polarity and amount of the voltage applied to the optocoupler input in enabled and disabled states. The limits provided in the specifications must not be exceeded in either direction. (This includes any present humming or other interference sources.) Further, make sure that the selected voltage source can supply the required currents.
2. Check whether the input type (HIGH/LOW) has been correctly set in the configuration software. If required, repeat the configuration process.

8.2.5 Operational Amplifiers are Marked As Defective

Possible reasons:

1. Insufficient pilot-tone level.
2. The high-frequency range is attenuated by the system.

The latter is caused preferably by HF-notch filters incorporated in the power amplifiers or by employing low-bandwidth transmitters.

Actions:

1. Check the pilot-tone level setting and the level encoders/faders on the amplifier. Also consider the input sensitivity of your power amplifiers.
2. Make the amplifier and pilot-tone level settings in a way that the amplifier outputs the pilot tone with a level of at least –30 dB (relative to 100 V). Then , re-set all parameters in question.

8.2.6 System Components Keep Temporarily Failing

Possible reasons:

1. Unstable data connection between the C.A.S. Analyzer and other C.A.S. components.
2. Frequent voltage drops.

Actions:

1. Use exclusively double-shielded cables for data connections. Make sure that the wiring is correct.
2. Check the soldered joints on the data-cable plugs.
3. Make sure that neither data nor mains cables are damaged.
4. Use an UPS unit for supplying all components of the C.A.S. system.

8.2.7 A Connected C.A.S. Device Does Not Work

Possible reasons:

1. The device was not entered into the configuration file.
2. The device was not in operation during the configuration process.
3. No functions were assigned to the controls of the device.
4. The device was replaced and includes an improper configuration or no configuration.
5. The data line is broken.
6. Missing or improper voltage supply.
7. The device is defective.

Actions:

1. Check whether the erroneous C.A.S. device is connected to the mains.
2. Make sure that all SCBs / LCBs in question are operated with the appropriate operating voltage. For his purpose, measure the voltage present at the last SCB / LCB of each line to make sure that the supply voltage does not fall below the required voltage due to voltage drops.
3. Check whether the data line between the C.A.S. Analyzer and other C.A.S. components is neither damaged nor broken.
4. Make sure that all devices have correctly been entered into the configuration file and all control elements have been assigned with the desired functions. If necessary, repeat the configuration process. (This is compulsory if a device has been replaced.)
5. If the device cannot be put into operation, contact a technician authorized by Salzbrenner Stagetec Audio Video Mediensysteme GmbH.

8.3 After Replacing a Device

If a device was replaced, additional steps may be required for returning the system to the previous state.

8.3.1 Speaker/Transmitter/SCB / LCB Replacement

When a speaker, transmitter, or SCB / LCB has been replaced, the SCB / LCB must be readjusted to the impedance of the connected speaker.

Caution!

Before performing the adjustment, make sure that no further defective speakers are present in the system as any SCB / LCB that such a defective speaker is connected to will not indicate an error afterwards. This is because the current measured by such SCBs / LCBs during the adjustment process is considered as the normal operating current.

Connect a PC to the system, run the configuration program, and configure the system. During this process, transfer the SCB / LCB parameters as explained in chapter 7.5. If you use the Analyzer in combination with a C.A.S. Master, it is sufficient to reconfigure only the Analyzer.

8.3.2 Generator

No additional steps must be performed after replacing a Generator as the Analyzer stores all operating parameters of the Generator and retransmits them to it immediately after switch-on.

8.3.3 Analyzer

If the Analyzer has been replaced, all data must be re-written to the new unit.

For this purpose, connect a PC to the system, run the configuration program, and configure the system. If you use the Analyzer in combination with a C.A.S. Master, it is sufficient to reconfigure only the Analyzer. The SCB / LCB parameters do not need to be re-sent if no modifications were made to the SCBs / LCBs or the speakers.

8.3.4 Amplifier and Transmitter

Normally, no additional steps must be performed after replacing an amplifier. However, if you are not sure whether you are able to reproduce all level settings and other parameters, we recommend you to re-adjust the SCBs / LCBs. Performing this may also be required if you are using a different amplifier or transmitter type that produces a different level especially in the 20-kHz range due to a different frequency response or impedance.

Connect a PC to the system, run the configuration program, and configure the system. During this process, transfer the SCB / LCB parameters as explained in chapter 7.5. There is not need to perform a full reconfiguration if no changes were made to other system components.

9 Service and Repairs

9.1 Inside Servicing

There are no user-serviceable parts inside the device. Any repair, battery-replacement, modification or extension works must be exclusively carried out by Salzbrenner Stagetec Audio Video Mediensysteme GmbH or an individual or institution authorized by Salzbrenner Stagetec Audio Video Mediensysteme GmbH.

9.2 Replacing the Mains Fuse

The power connector includes a drawer where the mains fuse and a spare fuse are located. Follow the procedure below to replace the fuse:

1. Disconnect the device from the mains.
2. Pull the power-cable plug out of the power connector.
3. Find the handle of the fuse drawer and pull the drawer fully out.
4. Remove the defective fuse from the back drawer part.
5. If necessary, carefully push the spare fuse out of the front drawer part using the defective fuse.
6. Insert this new mains fuse into its location. Use exclusively fuses meeting the below specifications:

5mm x 20mm, for a nominal voltage of 250V, 0.4A inert compliant with IEC 127-2/III

7. Push the drawer back into the power connector.
8. Connect the power-cable plug to the power connector of the device.
9. Connect the device to the mains.

If the new fuse blows again, disconnect the device from the mains again. Completely remove the power cable to avoid inadvertent mains connection. The mains fuse separates the device from the mains in only one phase, ensuring the absence of dangerous voltages inside the device.

Have the device checked by an authorized institution. Never try to carry out repair work yourself. Never use a fuse of a type other than specified. Never bridge the mains fuse using tin or alumni foil or other conducting items as this may cause fire or an electric shock.

9.3 Cleansing

Clean the device at least once a month.

For safety reasons, disconnect the device from the mains before cleaning.

Use a dry soft cloth to remove dust from the housing and the front panel. When dirt and dust are obstinate, use a soft cloth damped with small amount of dish-cleaning agent (ratio between agent and water: min. 1:3). Make sure the cloth is only slightly damped, so no liquid drip into the housing.

Warning!

Never use scoring agents or cloths. Never use thinners or cleaning agents containing solvents or alcohol, benzene, and especially acetone!

10 Specifications

10.1 Electrical Specifications

Parameter	Conditions	Value	Unit
Power-amplifier monitoring threshold	relating to 100 V, RMS	-30	dB
Ground-leakage monitoring threshold		50	kΩ
Signal current for 100-V relay	RMS, max.	8	A
Speaker-connector control voltage	RMS, max. peak, max.	100 141	V V
SCB-supply voltage range	min. max.	12 36	V V
interface level	RS232 min. RS485@110Ω, min. SCB-data bus@110Ω, min.	±5 1.5 ±750	V V mV
RTC accuracy	initial accuracy	±50	ppm
Pulse-generator input voltage	DC min. DC max.	20 28	V V
Error relay control voltage	DC max. AC RMS max.	60 30	V V
Relay-output current load	@24V DC	0.5	A
Optocoupler input voltage	HIGH min. HIGH max. LOW min. LOW max.	21 27 0 0,5	V DC V DC V DC V DC
Optocoupler input current	@+24V (typ.)	6	mA
Antenna-supply output voltage	min. max.	4.75 5.25	V V

Parameter	Conditions	Value	Unit
Antenna-supply load	max.	10	mA
Mains voltage	min. max.	207 253	V V
Mains frequency	min. max.	50 60	Hz Hz
Power consumption	max.	25	VA
Fuse	5mm x 20mm 250V IEC 127-2/III	0.4 inert	A

If not otherwise specified, all data relate to a mains voltage of 230V~ and a surrounding temperature of 20°C.

10.2 Physical Specifications

Parameter	Conditions	Value	Unit
Width	incl. front panel mounting width	483 440	mm mm
Height	incl. front panel mounting height	44 42	mm mm
Depth	in total device w/o front panel	211 201	mm mm
Weight	approx.	3,6	kg

10.3 Environmental Conditions

Parameter	Condition	Value	Unit
Temperature	Operating, min.	+1	°C
	same, max.	+40	°C
	Storage, min.	-40	°C
	same, max.	+70	°C
Humidity	non-condensing, min.	20	%
	same, max.	80	%
Noise emission		[1]	dB SPL
Altitude	Operation above sea level, min.	0	m
	same, max.	3000	m
	Storage above sea level, min.	0	m
	same, max.	10	km

Warning!

The storage-condition values must not be exceeded even during transport. This must be considered especially when transporting the device in closed cars or vans on hot days, or during air-transports.

[1] Background Noise

11 Options

11.1 C.A.S. Generator

The Generator layers a pilot ton onto the useful signals that are fed to a maximum of eight line amplifiers and one or two emergency amplifiers. This option is indispensable if the monitoring functions of the Analyzer are to be used.

Item	Order code
C.A.S. Generator	CAS-1020

11.2 SCB

SCBs / LCBs (Speaker Control Boards) are used for monitoring individual speakers, or (in system mode) for selective switching between two speaker signals and for controlling external consumers. Therefore, SCBs / LCBs are available either with or without control relays.

An Analyzer in standalone mode requires the use of SCBs / LCBs without relays. In system mode, SCBs / LCBs with and/or without relays can be used at the same time, depending on whether or not the SCB / LCB switch and the control relay are required.

SCB / LCB units are available either as a single board or as an entire device in an attractive housing. Cable connections are established using terminals.

Item	Order code
SCB / LCB w/ relay, circuit-board version	CAS-1016
SCB / LCB w/o relay, circuit-board version	CAS-1017
SCB / LCB w/ relay , device version	CAS-1018
SCB / LCB w/o relay , device version	CAS-1019

11.3 Receiver Antenna

The active receiver antenna is required if the DCF77 receiver incorporated in the C.A.S. Analyzer is used as a clock reference.

Item	Order code
DCF77 Active Receiver Antenna	A-9092

11.4 Configuration Software

The configuration software is required for setting up the entire system. The configuration determines how the individual system components interact with each other and respond to user operation. One software item is required per system.

C.A.S. *Soft* is required if the Analyzer is to be configured in connection with a C.A.S. Master (system mode) while C.A.S. *for* SCB is used for an Analyzer in standalone mode.

Item	Order code
C.A.S. *Soft*	CAS-1024
CASforSCB	CAS-1025

11.5 Signal Plug

The signal plugs are the counterparts of the back-panel male connectors. They feature a screw lock and are available with straight or angled cable connection.

Item	Order code
Plug, 4-pole, straight cable	A-9007
Plug, 4-pole, cable on top	A-9008
Plug, 4-pole, bottom cable	A-9009
Plug, 8-pole, straight cable	A-9019
Plug, 8-pole, cable on top	A-9020
Plug, 8-pole, bottom cable	A-9021
Plug, 9-pole, straight cable	A-9022
Plug, 9-pole, cable on top	A-9023
Plug, 9-pole, bottom cable	A-9024
Plug, 12-pole, straight cable	A-9031
Plug, 12-pole, cable on top	A-9032
Plug, 12-pole, bottom cable	A-9033
Plug connector set	A-9074
Contents: 3 Plugs, 4-pole	
4 Plugs, 8-pole, straight cable	
2 Plugs, 9-pole, straight cable	
2 Plugs, 2-pole, straight cable	

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